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ABSTRACT

While ability to read and think critically is the very basis of post-secondary education, increasing numbers of college students lack these skills. A sequence of two courses in critical reading and thinking are currently offered in the Concentrated Studies program at Duquesne University in Pennsylvania. In these courses, students who are inadequate readers study original texts (such as the writings of Aeschylus, Melville, and Tolstoy), and make use of innovative computer aids that provide coaching and drill-and-practice support. The computer programs--ABSTRACT, which teaches how to analyze a work for literary genre and structure, and INTERLOCUTOR, which allows teachers to create tutorials for machine-readable text--are original, and are written for IBM personal computers. The courses link texts to critical skills, for example, applying grammatical structure to Aristotle, or propositional logic to Machiavelli. The success of the approach has been demonstrated by retention, student achievement, and increase in the ability of Duquesne students to read and think critically. (SKC)

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Using Computers and Original Texts to Teach Critical Reading and Thinking

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ABSTRACT

While ability to read and think critically is the very basis of post-secondary education, increasing numbers of students lack these skills. This paper describes a sequence of two courses in critical reading and thinking currently offered in the Concentrated Studies program at Duquesne University. In these courses, students who are inadequate readers study original texts, and make use of innovative computer aids which provide coaching and drill-and-practice support. The success of our approach has been demonstrated by retention, student achievement, and increase in the ability of our students to read and think critically.

Using Computers and Original Texts to Teach Critical Reading and Thinking

The reading problem in the U.S.

The inability of many students to read difficult and challenging material and understand what they are reading may be the single most important academic problem in post-secondary education. Even if these students are hard workers, and well-intentioned, they are often unable to pick out main ideas, important sentences, etc. when reading, and then see how the author combines these into a coherent and sustained argument. They lack the ability to "synthesize and restructure ideas presented in specialized or complicated texts"[1], leaving them poorly prepared to enter college.[2] The *Chronicle of Higher Education*, pointing out the "inability of a majority of high-school students to understand, summarize, and explain complex materials," predicts that these students "will have difficulty coping with the demands of higher education."[3] *The Reading Report Card*[4], found only 5 percent of 17 year olds possessed of advanced reading skills; what is more troublesome is the fact that the reading samples used in the study were carefully selected/constructed texts which may, in fact, bear little resemblance to the kinds of reading actually required of post-secondary students.

Critical reading

A major reason for reading problems is that reading is usually not taught after the first few years of school, except for remedial reading for the nearly illiterate, or for those students with developmental problems of various kinds; the teaching of CRITICAL reading skills is virtually ignored. As a result, even the best post-secondary students may still be employing grammar-school reading strategies; any improvement in their skills is often the result of their independent reading, not instruction. This personal reading development is a very positive occurrence, and should be applauded and encouraged. People who are good independent readers show increases in their vocabulary, comprehension, and reading fluency;[5] often they internalize and unconsciously apply rules and strategies for good reading, and may also develop an understanding of good writing and an intuitive feel for grammatical rules even without having explicit knowledge of those rules -- bad grammar just "doesn't sound right." Unfortunately, this self-development does not often occur, and the student, out of frustration with his ability to read effectively, comes to feel that reading is a boring, difficult chore, which is best avoided, or to be done only under the greatest duress, if done at all.

Critical reading is an intellectual skill, and as such, it is learned by doing. Experienced readers have learned to ask questions as they read, to note interesting features of the text, to draw on their experience as a reader, etc. These techniques are then articulated and combined,

often unconsciously, into what we call critical reading ability. The greater this ability in the reader, the more capable he is of interacting with any text he chooses.

There is a good test for this. Give a book to a practiced reader, and almost unconsciously he will begin systematically inspecting the book, noting the title, the author, whether or not it has an index and table of contents; he will begin classifying the book, mentally placing it in a number of categories, drawing on his experience with other books; he may even begin leafing through the book, skimming to determine the author's purpose, argument, etc. Give the same book to a non-reader, and if he interacts with it at all, which is more than somewhat unlikely, he will do so only in an unco-ordinated and disjoint manner. At the end of an hour, the good reader will be able to tell you a great deal about the book; the poor reader, and the non-reader, little or nothing.

Reading problems in the classroom

Post-secondary students have certainly achieved some level of reading ability, but this level is not the same for all students, and is one of the things which differentiates good students from poor ones. In general, better students are better readers, who have efficient guidelines for approaching written material. The difficulty is that often even the best readers still have trouble reading difficult material, and may show the most astonishing ignorance and confusion when it comes to reading. It is not unusual for students to be unaware of the purpose of a footnote, a table of contents, or an index. There may be confusion as to the difference between an author and an editor, poetry and prose, fiction and non-fiction. Students may be at a complete loss when asked to state the subject matter of a work they have read, i.e., science, literature, philosophy, or what have you. Any written work, of whatever length or subject matter, is often referred to as a "story"; philosophic essays are "stories without characters." Perhaps even more astonishing, these problems can be seen to persist even to the graduate level.

Students may perceive their lack of reading ability and wish something could be done to help them read better. With the best of intentions, they may spend hour after hour in frustrated boredom, puzzling over an apparently impenetrable piece of writing, before foundering and giving up completely. Instructors, frustrated themselves, may try a number of approaches in an effort to meet this problem, but increasingly and inevitably, the reading load is lessened. Thus, inability of students to read effectively brings about what H. George Hahn II calls an "Academic Gresham's Law," as watered-down textbooks and ever-lighter reading loads replace the reading of challenging basic works.[6] This both increases the reading problem and erodes our cultural heritage, as the written tradition of the West slips away from the classroom. The result is that, inevitably, we continue to become a 'culture without culture,' at least inwritten form. Study of the humanities declines, narrow specialization increases, and intellectual relativism flourishes, as students become ever more narrowly focused and unable to appreciate the life of the mind.[7]

The Concentrated Studies program at Duquesne University

> Dull and unteachable persons are no more produced in the course of nature than are persons marked by deformity or monstrosity. Such are certainly few. A simple proof of this assertion is that among boys, most of them show good promise. And if it turns out that this promise never materializes, it is not usually for lack of latent ability, but because care was never taken in nurturing it. You may respond that some surpass others in ability. I grant this to be true, in that some accomplish more and others less. But there is no one who does not gain by some studying.[8]

Duquesne University, with a declared mission to the community to reach out to students often ignored or overlooked, has had long experience with educational problems. Our Concentrated Studies program, for example, deals exclusively with incoming students who lack academic expertise, but not ability, and who would not ordinarily be admitted to higher education at our University. These are high-risk students, usually with SAT Verbal scores between 250 and 500, but often actually quite bright. Commonly, these students do not know HOW to do well in an educational setting; in dealing with them, we stress what the Study Group on the Conditions of Excellence in American Higher Education has called the "three critical conditions of excellence": student involvement in their own learning process, high expectations on the part of their faculty, and careful assessment and feedback regarding student work.[9]

Working with the students in this program has convinced us of the importance of READING ability as a BASIS for developing all the other intellectual skills needed in post-secondary education. While experience with students in the general population has confirmed that reading difficulties cut across the undergraduate spectrum, the Concentrated Studies students are a population with consistent, obvious, and serious reading difficulties, and so, as a group, they have the most pressing need to develop a high level of reading skill as quickly as is possible.

Our solution

> If we think of it, all that a University, or final highest School can do for us, is still but what the first School began doing -- teach us to *read*.[10]

> If you would be a good reader, read; if a writer, write.[11]

Reading skill is certainly developed by reading. College students, however, are relatively late in their academic careers, and have an urgent need to develop critical reading ability. They simply cannot take several years off to read challenging material, hoping to self-formulate and internalize reading rules. Rather, novice critical readers need guided practice; in effect, an

experienced reader who can sit down with them and make the strategies used in reading obvious to them. If this coaching is done long enough, the student can possibly learn how to imitate their coach and do this kind of reading for themselves.

In trying to help novice readers to become critical readers, we would want them to be able to do a number of things:

- Inspect a book, gathering basic information about it, classifying it according to subject matter and type, and noting its structure.
- Read and interact with a work, including answering questions about the author's strategies, and the content of the work.
- Write a summary of the work.
- Develop and articulate meaningful criticisms of the work.

Use of original texts

We believe the most effective way to practice reading and thinking skills is by reading and thinking about the best written materials in our tradition, a position shared by most of the Study Group on the State of Learning in the Humanities in Higher Education.[12] Call these 'classics,' 'great books,' 'masterpieces,' however you like; these works are thought to be the greatest our culture has produced: writings of Aeschylus, Melville, Chaucer, Tolstoy, and so on. These texts would provide students with challenging materials, as well as a better understanding of the western intellectual tradition. But, given that these works are the best, the most challenging, the most thought-provoking, they are also the most difficult, not because they are badly written, but rather because these works have so much to offer. To a student with reading difficulties, such texts, the basis of the liberal arts curriculum, could prove overwhelming.

Computer support

Since novice readers need intensive individual coaching and drill-and-practice obviously beyond the ability of the instructor to satisfy, it would seem that the computer could provide an environment within which students could acquire critical reading skills. Since no pre-existing software seemed to exist which would do this in the way we wanted, we developed our own programs for the teaching of critical reading skills, written in TURBO Pascal and designed to run on the standard and ubiquitous IBM PC.

ABSTRACT

The ABSTRACT program leads users through the study of the structure and basic content of literary works, stressing process, and the development of a set of heuristics for dealing

efficiently with any work. The program is designed to be used with a book in hand. The student is asked to give the title of the work, name of the author, date of the work's writing and publication, etc. After this, the student classifies the work according to subject matter and literary type. There is built-in dictionary support for this task, since students are often at a complete loss as to what a novel is, or a play, or a short story, or how the subject matter of a philosophic work differs from a piece of imaginative writing. This dictionary capability is completely flexible: the instructor creates the dictionary file which the program uses. Next, the user schematizes the structure of the work in response to machine-generated questions. Finally, the program allows for prompted summary-writing, and asks for the student's critical opinion of the work. Natural exit point occur in the program at each shift to another task, and student responses are written to a work diskette, to be printed out and graded by the instructor. No provision has been made for machine checking of the responses to allow for maximum flexibility.

INTERLOCUTOR

INTERLOCUTOR allows the teacher to create tutorials which feature various kinds of question and answer and screen manipulations, windowing, and the ability to have an on-line dictionary of words and concepts, again created by the instructor. This program is designed to enable instructors to lead students through the critical reading of text by means of a machine-based dialectic, though it is also useful for creating standard Q&A tutorials.

Machine-readable texts

INTERLOCUTOR is designed to be used with machine-readable texts, which we can create using a university-owned Kurzweil Reading machine to optically scan text and read it over to an IBM PC.[13] We now have a small library of over 50 texts on diskette, including works by Milton, Bacon, Mill, Emerson, Aquinas, and others. All of these texts are in English translation, and are in the public domain, for the most part, so as to avoid any copyright problem. In addition to creating interactive tutorials, having texts on diskette is a cheap alternative to buying books, the price of which is growing prohibitive -- students purchase "hard copy" generated by a high-quality printer from the stored text.

Our two-course critical reading program

Concentrated Studies students at Duquesne, as part of their curriculum, take Critical Reading I and II, two courses designed to give them intensive guided practice in reading effectively, help them develop good study habits, and provide the beginnings of a cultural background for their studies. Direct instruction is emphasized: goals are established, assignments are well-organized and presented in sequence, careful explanations are given at each stage, questions are asked frequently, and there is much opportunity for practice.[14] Homework is

assigned such that the student has at least two hour of preparation for each class.

Critical reading I (Argument Analysis)

In Critical Reading I, subtitled 'Argument Analysis', students are introduced to critical reading by way of grammatical and logical analysis. The focus of the course is political philosophy, and the reading of works which are fundamental to the American political tradition. Stress is on reading and understanding; a student who cannot critically read and understand a work is really in no position to think critically about it; critical thinking comes later. Movement is from smaller grammatical and logical units to larger: from word to sentence to paragraph to chapter to book, from term to proposition to argument.

The reading list includes Aristotle's *Politics*, books I, III, IV; Machiavelli's *Prince*; Thomas Aquinas' *Treatise on Law*, QQ. 90 - 97; Locke's second essay on government, *Of Civil Government*; Montesquieu's *Spirit of Laws*, books I - XIII; Rousseau's *Social Contract*; the *Declaration of Independence*; the *Articles of Confederation*; the *Constitution of the United States*; and *The Federalist Papers*. All of these texts, but for the *Federalist Papers*, are in machine-readable form, and hard copy is generated by laser printer and purchased by the student instead of books. This hard copy is drilled with holes so that it will fit in a binder, giving everyone in the class what amounts to a loose-leaf book. This format has many advantages, not the least of which is the ability to interleave notes between the pages, and the convenience of collecting the texts to determine whether the students have been marking in their texts as they read.

The course, which meets three times per week, begins with a review of grammar, and a reading of Aristotle. Along the way, grammatical structures are treated, including the use of modifiers, parallelism, subordination, and the like. After the grammatical review, Aristotelian logic is taken up: signs, words, and terms; division, definition. The exam for this segment is a grammatical and logical analysis of a section from the *Politics*. The students are also required to write a summary of the reading, as well as write three short (1 page) essays. Computer support is provided in the form of tutorials and glossed sections of texts, using the INTERLOCUTOR program. These lessons must be kept short, 20 - 30 minutes long, since the computer screen is not the best way to present written material. Further, the information on the machine is merely a fraction of the length of the whole -- the student is expected to get machine coaching, then go on to read the text for himself.

Next is a reading of Machiavelli, and a study of propositions. The exam, again, is an analysis of a section of text, and again the students write a summary of text, and are given three short essay questions which deal with the material. The Locke reading follows, and the class focus shifts to paraphrasing and the nature and classification of paragraphs. Again, there are short essays to write, as well as a summary, section-by-section, of the Locke reading. Movement

is from the paragraph to the chapter and book. The study of paragraphs, chapters, and books continues with Rousseau's *Social Contract*. The exam for this section involves an analysis of a section of Rousseau.

As the class proceeds, there are frequent quizzes and pop-quizzes. Outside the class, the students are expected to do much reading and writing, while class time is devoted primarily to a combination of dialectic and lecture. In addition, as relevant to the reading, time is devoted to such things as the use of footnotes; the logical and grammatical strategies of the author; the construction of the text; the purpose of a table of contents, preface, introduction, etc.

By this time, students who are doing the work typically begin to comment on the noticeable changes in their reading habits, as well as the increased attention which they now pay to what they read. Students find their reading getting easier, and their other instructors may begin to comment on how much better they are doing.

About mid-semester, the emphasis of the class shifts to formal logic. The students begin reading part of Aquinas' *Treatise on Law* for arguments, which they pick out, paraphrase, and diagram. Again, as in the previous sections of the class, INTERLOCUTOR tutorials are provided to give them coaching. Next, syllogisms are touched on in a limited way. The whole point is to focus the student's attention on arguments, and get them to pay closer attention to the form and structure of philosophic exposition. The exam for this section involves reading a section of texts and diagramming the arguments found therein.

After this, the class touches on first-order symbolic logic, which the students use in the symbolization of passages from the Montesquieu reading. This is useful because the students are essentially translating passages from the English text into another, very restricted language of variables and symbolized operations. As anyone who has done translating from one language to another knows, restating something in another language requires a high level of understanding of the text. The exam for this section, obviously, involves reading and symbolizing a section of text.

Finally, the last few weeks of the class are spent in comparing passages in books with one another, using the *Federalist Papers* and the American State papers as the central reading. Some of the propositions set out in the *Constitution* and the *Declaration of Independence* are isolated, and traced back through the class readings, in an effort to understand something about the development of thinking concerning those propositions, and the dialectic which has occurred among the authors in question. The final is comprehensive, and involves applying the skills learned throughout the semester.

Critical reading II (Great Books Seminar)

Giving the student a chance to develop and state his opinion about what he has read is the

purpose of Critical Reading II, a Great Books Seminar. This class, which also meets three times a week, functions primarily by dialectic, and the student is given practice in thinking and arguing about what he reads. Much use is made of discussion and question-and-answer, an approach cited in *What Works* for its effectiveness in checking student understanding and providing models of what to look for when reading[15] as well as in raising student achievement.[16] Questions are considered by the class: "Was Socrates foolish for not escaping from prison?", "Is *The Prince* an evil book?", "What is the lesson of *Job*?" etc.

In this class, students are given the ABSTRACT program to use for guided inspection of the texts read as well as summary writing. INTERLOCUTOR lessons on aspects of the reading are also provided. Every few weeks, students are given unfamiliar books, selected at random, on which they must perform an in-class non-computer-assisted inspectional reading. Class work includes one ABSTRACT-assisted summary and inspectional reading per week, one journal entry per class, and the annotation of the texts read.

Reading for the Great Books Seminar include selections from all the readings used in the Argument Analysis class, as well as other texts: *the Epic of Gilgamesh* and *Genesis*, other selections from the *Bible*, Greek drama, several Platonic dialogues, a play by Shakespeare, and others. One work or section of a work is read per class; the goal is not a full treatment of the work, so much as an introduction to how to read different works, and the achievement of a certain familiarity with these writings as some of the most important our culture has produced. The expectation is that these works will be encountered again by the students in other classes, at which time the students will be better prepared to read and think about them.

Student responses to the courses and software

Critical Reading I and II are required of all Concentrated Studies students, with virtually no exceptions. The workload is heavy, but as Mill says, "A pupil from whom nothing is ever demanded which he cannot do, never does all he can."[17] The common initial response on the part of the students is absolute disbelief that anyone could expect them to do so much work. Common complaints are that they don't understand, that it is an impossible amount of work to do, that the work cuts into their social lives, that doing these tasks won't help them become a pharmacist/marry a doctor/get a job, etc. When the instructor does not give in, complaints gradually die out, and most of the students settle in for the long haul. A small number of students, however, decide not to do the work, or even try; these student leave the Concentrated Studies Program and the university.

Those who remain find that they can no longer remain completely passive, but must take greater responsibility for their own learning than they ever have before. After a number of bad moments, most students realize early on that they must have a plan for studying: there is far too much to finish in one sitting. Academic skills are constantly challenged; unlike many of their

peers,[18] they cannot avoid intellectual activity. The truth of the observation that "student performance clearly rises to [high] expectations, and students respond favorably to reasonable challenges"[19] is demonstrated as the academic year progresses. Regular feedback and assessment of progress occurs, and personal contact is stressed. Inevitably, many of the students begin to adapt to the increased academic pressures, developing those skills which such adaptation requires: "ability to think critically, to synthesize large quantities of new information, and to master the language skills (critical reading, effective composition, clear speech, and careful listening) that are the fuel of thought."[20]

A typical example of their development is seen in the use of the ABSTRACT program. This is almost unbearably onerous initially: the program is devised such that all the questions it asks about a book must be answered at one sitting, something which takes thirty to sixty minutes. Further, careless errors on the part of the user can only be corrected by beginning the whole answering process over again. For students who are in the habit of working at five to ten minute stretches, with ample breaks, spending an hour on a single intellectual task, to the exclusion of all else, seems almost impossible. Inevitably, however, since use of the program is required, they become more efficient at examining books. Many choose to work in groups, helping one another out; it is not uncommon to see four or five students discussing whether a particular book is philosophy or literature, fiction or non-fiction, etc.

After a time, students find that while Critical Reading I & II are a great deal of work, none of the individual tasks asked of them are all that difficult. Students who do the classwork regularly find that the workload gets lighter as they develop better study habits and their ability to read and think critically increases. For many students, learning that there is a pattern and structure to written works, and that careful reading and analysis can uncover this pattern, is a revelation. In finally learning how to learn, many of these students develop the ability to finally succeed academically. It is not uncommon for some of the students to do extra-credit work, earning hundreds of points by outlining texts, writing summaries, diagramming arguments, and the like; some even end each semester with well more than the maximum number of points for an 'A' grade.

Criticism and defense of our approach

> ...mankind are by no means agreed about the things to be taught...[21]

Our approach has been much criticized. We have been accused of being elitist, of requiring too much work of the students, of asking them to read works impossibly beyond their limited intelligences and abilities. We have been taken to task for our assumption that there is a cultural heritage, and that some books are more worth reading than others, that some things are

more worth knowing than others. The great number of works read has been faulted, as well as the speed with which the class moves through them. The choice of readings has come under fire: more poetry, less philosophy, little emphasis on scientific writing, absence of contemporary authors, women. And so on.

Our reply is that these are simply two courses, designed to help poor readers develop the ability to read and think critically. While the Great Books reading list varies constantly, we cannot read every work worth reading with the students, nor can we even be expected to deal with every type of writing. The goal is to give the student practice in intellectual skills as well as the beginnings of a cultural background. It is up to the general university curriculum to continue what we have begun.

One last criticism: some have said that they simply know that our approach is impossible, or that it couldn't work with their population of students. One again, it must be kept in mind that our students are special admission students, with SAT verbal scores of 250-500, typically. It should also be pointed out that in addition to Critical Reading, the Concentrated Studies curriculum also includes required courses in Latin, Etymology, and English Composition — by no means a negligible course load. Despite the difficulty of the courses, more than 30 of these high-risk, special admission Concentrated Studies students earned a final 'A' or 'B' in Critical Reading I (Argument Analysis) after the first semester of the fall 1986 semester. Further, a great number of those students also earned a spot on the Dean's List. We show a retention rate equal to or greater than that of the university taken as a whole, and many of our students go on to do quite well academically. If this is not enough to convince the skeptic, we don't know what could.

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